CLAIMS

I claim:

1. A system comprising:

a Modbus device having an embedded automation application, the Modbus device being operably connected to a communication bus;

a fieldbus coupler operably connected to the automation application via the communication bus;

a network being operably connected to the fieldbus coupler, the network including a network node having a table for holding data and parameters transmitted or received throughout the system; and,

a protocol utilized by the automation application to access the network node.

2. The system of Claim 1 wherein the protocol comprises:

a Modbus message frame comprising:

a header having an address identifier;

a trailer having an error verifier; and,

a Modbus function code encapsulated between the header and the trailer,

wherein the automation application transmits a network message embedded within the Modbus function code to the network node table.

3. The Modbus communication protocol of Claim 2 wherein the Modbus function code comprises a Modbus sub-function code.

4. The Modbus communication protocol of Claim 2 wherein the Modbus function code comprises:

a read/write function code having a read/write bit, the read/write function code further being operably responsive to the read/write bit wherein the read/write function code reads or writes the network node table .

5. The Modbus communication protocol of Claim 4 wherein the read/write function code comprises:

an index and a sub-index defining a location within the network node table; and,

a starting address, the starting address is an offset into the network node being referenced by the index and the sub-index.

6. The Modbus communication protocol of Claim 5 wherein the read/write function code comprises:

a byte amount defining an amount of bytes, the starting address and the byte amount defining a portion within the network node table to be read or written by the read/write function code wherein the automation application can directly access the portion of the network node table .

7. The Modbus communication protocol of Claim 2 wherein the Modbus function code comprises a plurality of Modbus function codes encapsulated within the Modbus message frame.

8. The system of Claim 1 wherein the network is CANOpen.

9. The system of Claim 1 wherein the table is a CANOpen object dictionary.

10. An automation control system comprising:

a fieldbus coupler operably connected to a Modbus communication bus;

a Modbus device having an automation application, the Modbus device being operably connected to the fieldbus coupler via the Modbus communication bus;

a Modbus protocol for communicating between the Modbus device and the fieldbus coupler;

a network communication bus being operably connected to the field bus coupler;

a network device being operably connected to the fieldbus coupler via the network communication bus;

a network protocol for communication between the network device and the fieldbus coupler;

the Modbus device and the network device being in communication with each other wherein the fieldbus coupler facilitates communication between the Modbus device and the network device by converting to and from the Modbus protocol and the network protocol.

11. The system of Claim 10 wherein the fieldbus coupler comprises:

a fieldbus physical layer transceiver being operably connected to the Modbus communication bus;

a Modbus to network bridge being operably connected to a network driver and the physical layer transceiver;

a fieldbus driver being operably connected to the network driver;

a fieldbus network table being operably connected to the network driver; and,

a fieldbus network transceiver being operably connected to the network driver and the network communication bus.

12. The system of Claim 10 wherein the Modbus device comprises:

a Modbus physical layer transceiver being operably connected to the Modbus communication bus;

a Modbus driver being operably connected to the Modbus physical layer transceiver; and,

an automation application being operably connected to the Modbus driver.

13. The system of Claim 10 wherein the network device comprises:

a network transceiver being operably connected to the network communication bus;

a network driver being operably connected to the network transceiver;

a network table being operably connected to the network driver; and,

a field application being operably connected to the network driver.

14. The system of Claim 13 wherein the table is a CANOpen object dictionary.

15. The system of Claim 10 wherein the network is CANOpen.

16. A Modbus communication protocol for an automation system executing an automation application, the automation system comprising a fieldbus coupler being operably connected between a Modbus network having a Modbus device and a network having a network device including a network table, the Modbus communication protocol comprising:

a Modbus message frame comprising:

a header having an address identifier;

a trailer having an error verifier; and,

a Modbus function code encapsulated between the header and the trailer, wherein the automation application transmits a network message embedded within the Modbus function code to the network device table.

17. The Modbus communication protocol of Claim 16 wherein the Modbus function code comprises a Modbus sub-function code.

18. The Modbus communication protocol of Claim 16 wherein the Modbus function code

comprises:

a read/write function code having a read/write bit, the read/write function code further being operably responsive to the read/write bit wherein the read/write function code reads or writes the network device table.

19. The Modbus communication protocol of Claim 18 wherein the read/write function code comprises:

an index and a sub-index defining a location within the network table ; and,

a starting address, said starting address is an offset into the table being referenced by said index and said sub-index.

20. The Modbus communication protocol of Claim 19 wherein the read/write function code comprises:

a byte amount defining an amount of bytes, the starting address and the byte amount defining a portion within the network table to be read or written by the read/write function code wherein the automation application can directly access the portion of the network table .

21. The Modbus communication protocol of Claim 16 wherein the Modbus function code comprises a plurality of Modbus function codes encapsulated within the Modbus message frame.

22. The Modbus communication protocol of Claim 16 wherein the network is CANOpen.

23. The Modbus communication protocol of Claim 16 wherein the table is a CANOpen object dictionary.

24. A method of transmitting a network message in an automation system comprising a network and a Modbus network, the method comprising the steps of:

providing a network message embedded within a Modbus function code;

transmitting the Modbus function code to a network node;

extracting the network message; and,

executing the network message wherein the network node being capable of interacting with the Modbus network.

25. The method of Claim 24 wherein the network node comprises a table , the method further comprising:

accessing a portion of the table.

26. The method of Claim 25 further comprising:

embedding a network response message within a response Modbus function code; and,

transmitting the response Modbus function code to the Modbus network.

27. The method of Claim 25 wherein the network is CANOpen.

28. The method of Claim 25 wherein the table is a CANOpen object dictionary.

29. A medium readable by a computer, the medium providing a protocol for communicating within an automation system executing an automation application, the automation system including a Modbus network and a network, the medium comprising:

a first function code having a read/write bit, the first function code being responsive to the read/write bit wherein the read/write function code reads or writes a table of a network device.

30. The medium of Claim 29 further comprising:

a second function code comprising a plurality of Modbus function codes encapsulated within the second function code.

31. The medium of Claim 29 wherein the first function code comprises:

an index and a sub-index defining a location within the table of the network device ; and,

a starting address, said starting address is an offset into the table being referenced by said index and said sub-index.

32. The medium of Claim 31 wherein the first function code comprises:

a byte amount defining an amount of bytes, the starting address and the byte amount defining a portion within the table to be read or written by the first function code wherein the automation application can directly access the portion of the table of the network device .

33. The medium claim of 29 wherein the network is CANOpen.

34. The medium claim of 29 wherein the table of the network device is a CANOpen object dictionary.